Greater San Diego Science and Engineering Fair
2016 PROJECT SUMMARY

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Project Title: Rapid Alert and Prevention from Heat Stroke

Abstract

Objectives/Goals The goal of this project was to determine how to rapidly detect rises in body temperature and prevent the possible oncoming of heat stroke.

Hypothesis It was hypothesized that the Peltier tile would cool the skin down by 1-2 degrees when activated by the temperature controller. Additionally, the temperature sensor would trigger an alert signal to the computer when the skin's temperature would exceed 98.9 degrees Fahrenheit.

Methods/Materials The alert and cooling systems were tested 20 times each. A silicone rubber sheet was used as a simulation of skin for the experimentation. The sheet was heated to a temperature above 98.9 degrees Fahrenheit. The systems were placed onto the heated silicone rubber sheet, and results and data were gathered.

Results The temperature alert system worked 16 times out of the 20 that it was tested. It had 80% accuracy with detecting temperatures above 98.9 degrees Fahrenheit and alerting the computer. The alert that was sent to the computer was sometimes delayed, triggering the alarm on the computer about one to two minutes late. The temperature control system worked 18 times out of the 20 that it was tested. It had 90% accuracy with turning the Peltier tile on and off based on the silicone's temperature. The Peltier tile would turn on exactly when the temperature would rise above 98.9 degrees and would turn off exactly when the temperature would fall back to 98.9 degrees or lower.

Conclusions/Discussion The data showed that the hypothesis was correct. The temperature alert system was able to successfully send an alarm to the computer whenever the temperature of the silicone rubber sheet would rise above 98.9 degrees Fahrenheit. The temperature control system was able to successfully turn the Peltier tile on when the sheet's temperature would rise above 98.9 degrees and turn the Peltier tile off when the sheet's temperature would return back to normal. The Peltier was able to cool the temperature of the silicone rubber sheet by 0.5 to 1 degree Fahrenheit

Summary Statement This project created a temperature alert and cooling system to detect and prevent the onset of heat stroke in an individual.

Help Received Parents helped get materials for testing. Mom helped with basic coding skills required for Arduino. Dad assisted in soldering of components in the temperature control system.